NATIONAL INSTITUTES OF HEALTH — FRUIT & VEGETABLE SCREENER

INSTRUCTIONS: Think about what you usually ate in the last month. Think about all the fruits and vegetables that you are last month. Include those that were: a) raw and cooked; b) eaten as snacks and at meals; c) eaten at home and away from home (restaurants, friends, take-out); and d) eaten alone and mixed with other foods. Report how many times per month, week or day you ate each food and, if you ate it, how much you usually had. If you mark "Never" for a question, follow the "Go to" instruction. **Choose the best answer** for each question. **Mark only one** response for each question.

1. Over the last month, how many times per month, week, or day did you drink **100% juice** such as orange, apple, grape, or grapefruit juice? **Do not count** fruit drinks like Kool-Aid, lemonade, Hi-C, cranberry juice drink, Tang and Twister. Include juice you drank at all mealtimes and between meals.

○	○	○	○	○	○	○	○	○	○
Never (Go to Q2)	1-3 times last **month**	1-2 times per **week**	3-4 times per **week**	5-6 times per **week**	1 time per **day**	2 times per **day**	3 times per **day**	4 times per **day**	5 or more times/**day**

1a. Each time you drank 100% juice, how much did you usually drink?

○	○	○	○
Less than ¾ cup (less than 6 ounces)	¾ to 1¼ cup (6 to 10 ounces)	1¼ to 2 cups (10 to 16 ounces)	More than 2 cups (more than 16 ounces)

2. Over the last month, how many times per month, week, or day did you eat **fruit**? Count any kind of fruit — fresh, canned, and frozen. **Do not count** juices. Include fruit you ate at all mealtimes and for snacks.

○	○	○	○	○	○	○	○	○	○
Never (Go to Q3)	1-3 times last **month**	1-2 times per **week**	3-4 times per **week**	5-6 times per **week**	1 time per **day**	2 times per **day**	3 times per **day**	4 times per **day**	5 or more times/**day**

2a. Each time you ate **fruit**, how much did you usually eat?

○	○		○	○
Less than 1 medium fruit	1 medium fruit	**OR**	2 medium fruits	More than 2 medium fruits
○	○		○	○
Less than ½ cup	About ½ cup		About 1 cup	More than 1 cup

3. Over the last month, how often did you eat **lettuce salad (with or without other vegetables)**?

○	○	○	○	○	○	○	○	○	○
Never (Go to Q4)	1-3 times last **month**	1-2 times per **week**	3-4 times per **week**	5-6 times per **week**	1 time per **day**	2 times per **day**	3 times per **day**	4 times per **day**	5 or more times/**day**

3a. Each time you ate **lettuce salad**, how much did you usually eat?

○	○	○	○
About ½ cup	About 1 cup	About 2 cups	More than 2 cups

4. Over the last month, how often did you eat **French fries** or **fried potatoes**?

○	○	○	○	○	○	○	○	○	○
Never (Go to Q5)	1-3 times last **month**	1-2 times per **week**	3-4 times per **week**	5-6 times per **week**	1 time per **day**	2 times per **day**	3 times per **day**	4 times per **day**	5 or more times/**day**

4a. Each time you ate **French fries** or **fried potatoes**, how much did you usually eat?

○	○	○	○
Small order or less (About 1 cup or less)	Medium order (About 1½ cups)	Large order (About 2 cups)	Super Size order or more (About 3 cups or more)

5. Over the last month, how often did you eat **other white potatoes**? Count **baked**, **boiled**, and **mashed potatoes**, **potato salad**, and **white potatoes that were not fried**.

○	○	○	○	○	○	○	○	○	○
Never (Go to Q6)	1-3 times last **month**	1-2 times per **week**	3-4 times per **week**	5-6 times per **week**	1 time per **day**	2 times per **day**	3 times per **day**	4 times per **day**	5 or more times/**day**

5a. Each time you ate **these potatoes**, how much did you usually eat?

○	○	○	○
1 small potato or less (½ cup or less)	1 medium potato (½ to 1 cup)	1 large potato (1 to 1½ cups)	2 medium potatoes or more (1½ cups or more)

6. Over the last month, how often did you eat **cooked dried beans**? Count **baked beans**, **bean soup**, **refried beans**, **pork and beans**, and **other bean dishes**.

○	○	○	○	○	○	○	○	○	○
Never (Go to Q7)	1-3 times last **month**	1-2 times per **week**	3-4 times per **week**	5-6 times per **week**	1 time per **day**	2 times per **day**	3 times per **day**	4 times per **day**	5 or more times/**day**

6a. Each time you ate **these beans**, how much did you usually eat?

○	○	○	○
Less than ½ cup	½ to 1 cup	1 to 1½ cups	More than 1½ cups

7. Over the last month, how often did you eat **other vegetables**?

DO NOT COUNT:
- Lettuce salads
- White potatoes
- Cooked dried beans
- Vegetables in mixtures, such as sandwiches, omelets, casseroles, Mexican dishes, stews, stir-frys, soups, etc.
- Rice

COUNT:
- All other vegetables — raw, cooked, canned, and frozen

○	○	○	○	○	○	○	○	○	○
Never (Go to Q8)	1-3 times last **month**	1-2 times per **week**	3-4 times per **week**	5-6 times per **week**	1 time per **day**	2 times per **day**	3 times per **day**	4 times per **day**	5 or more times/**day**

7a. Each time you ate **other vegetables**, how much did you usually eat?

○	○	○	○
Less than ½ cup	½ to 1 cup	1 to 1½ cups	More than 1½ cups

8. Over the last month, how often did you eat **tomato sauce**? Include tomato sauce on pasta or macaroni, rice, pizza and other dishes.

○	○	○	○	○	○	○	○	○	○
Never (Go to Q9)	1-3 times last **month**	1-2 times per **week**	3-4 times per **week**	5-6 times per **week**	1 time per **day**	2 times per **day**	3 times per **day**	4 times per **day**	5 or more times/**day**

8a. Each time you ate **tomato sauce**, how much did you usually eat?

○	○	○	○
About ¼ cup	About ½ cup	About 1 cup	More than 1 cup

9. Over the last month, how often did you eat **vegetable soups**? Include tomato soup, gazpacho, beef with vegetable soup, minestrone soup, and other soups made with vegetables.

○	○	○	○	○	○	○	○	○	○
Never (Go to Q10)	1-3 times last **month**	1-2 times per **week**	3-4 times per **week**	5-6 times per **week**	1 time per **day**	2 times per **day**	3 times per **day**	4 times per **day**	5 or more times/**day**

9a. Each time you ate **vegetable soup**, how much did you usually eat?

○	○	○	○
Less than 1 cup	1 to 2 cups	2 to 3 cups	More than 3 cups

10. Over the last month, how often did you eat **mixtures that included vegetables**? Count such foods as sandwiches, casseroles, stews, stir-fry, omelets, and tacos.

○	○	○	○	○	○	○	○	○	○
Never	1-3 times last **month**	1-2 times per **week**	3-4 times per **week**	5-6 times per **week**	1 time per **day**	2 times per **day**	3 times per **day**	4 times per **day**	5 or more times/**day**

Reference:

Thompson, F. E., Subar, A. F., Radimer, K., Smith, A. F., Midthune, D., Rosenfeld, S., & Kipnis, V. (in press). Performance of two new cognitively enhanced fruit and vegetable short assessment forms (Abstract). Public Health Nutrition.

Revised Scoring Percent Energy From NCI Fat Screener

1. **Convert reported frequency category to average daily number of times consumed:**

   - Convert each frequency response category to the midpoint of that frequency range, and standardize to times per day:
     - Never = 0
     - Less than once a month = .018
     - 1-3 times per month = .066
     - 1-2 times per week = .214
     - 3-4 times per week = .499
     - 5-6 times per week = .784
     - 1 time per day = 1
     - 2 or more times per day = 2

2. **Estimate the individual's percent energy from fat, by applying regression coefficients to each food item:**

   a) First, estimate how much of the fat added to foods is regular fat. Add the responses for the 3 fat added questions in the grid, then apply the information in Q2 about how often the fat added was reduced fat. You can use the following code:

   ```
   totfat = sum(marg on bread, marg on veg, marg on rice);
   If q2 in (1,2) then regfat=totfat;
   else if q2 eq 3 then regfat=totfat*.75;
   else if q2 eq 4 then regfat=totfat*.5;
   else if q2 eq 5 then regfat=totfat*.25;
   else if q2 eq 6 then regfat=0;
   ```

   b) The dependent variable, percent energy from fat, is then estimated by the following equation:

   ```
   estpcalfat=31.84935 - (.93376*cereal) + (2.31628*eggs) -
   (2.38211*citrusjuice) + (6.32391*hotdogs) + (2.00977*cheese) +
   (3.73339*friedpot) - (2.58347*skim milk) + (4.1064*sausage) –
   (1.71212*fruit) + (3.37789*mayo) + (5.92817*salad dressing) +
   (1.95707*reg.fat) - (2.86065*rice);
   ```

   Note that the last question is not used in this scoring. Question 3 by itself was correlated with percent energy from fat, but it is unnecessary if the other questions are used to more precisely estimate the individual's percent energy from fat.

Scoring for Fruit and Vegetable Screeners
(Updated 2/25/2000)

There are two recent screeners, developed at NCI. They are similar in content, except that one screener asks about fruit and other vegetables by 3 periods of day, whereas the other asks these items over all days.
The information collected from each screener can be used to estimate the total number of Pyramid servings of fruits and vegetables consumed daily. A Pyramid serving is defined by USDA as: vegetables: 1 cup leafy or ½ cup; fruit juices: 3/4 cup; and fruit: 1 whole fruit or ½ cup of cut-up fruit.

A. ALL DAY SCREENER

For the over all day screener, scoring involves two separate algorithms, one for converting the frequency information, and the other for converting the portion size information.

1. Convert reported frequency category to average daily number of times consumed:
Convert each frequency response category to the midpoint of that frequency range, and standardize to times per day:

Never=0
1-3 times per month=.066
1-2 times per week=.214
3-4 times per week=.499
5-6 times per week=.784
1 time per day=1
2 times per day=2
3 times per day=3
4 times per day=4
5 or more times per day= 5

2. Assign fruit and vegetable Pyramid Servings for each portion size category

Juice				
	.75	1.33	2.17	2.5
Fruit				
	.75	1.0	2.0	2.5
	.75	1.0	2.0	2.5
Lettuce salad				
	.5	1.0	2.0	2.5
French fries				
	1.25	2.3	3.1	4.8
Other white potatoes				
	.8	1.5	2.4	3.5

Dried beans
.75 1.5 2.5 3.5
Other vegetables
.75 1.5 3.0 4.5
Tomato sauce
.36 .72 1.45 1.7
Vegetable soups
.75 1.36 2.27 3.2

3. Compute f&v daily pyramid servings for each food group

For each food group, multiply the daily average frequency (from #1) by the portion size (from #2).

To estimate total daily number of pyramid servings, add across all foods.

NOTE that q.10 mixtures that included vegetables is not included in this algorithm. This question may be helpful in identifying individuals who eat a lot of their vegetables in mixtures. If amounts of vegetables eaten in mixtures are harder to report, their reports may be somewhat less accurate. However, this is untested so far.

4. How to handle missing data

a. Assigning reasonable data to individual questions with missing answers:
(1) Frequency of intake for individual foods
Assume Never=0, since many people don't fill in any bubble when they do not consume a food.
If portion size for that item is answered and the frequency question is not answered, continue to treat as Never.
(2) Portion size
Note: portion size is not missing if the frequency question stem above it is answered Never or assigned Never.
If a vegetable, assign the most frequently reported portion size category for all other individual vegetable questions. [Exclude "other vegetables" from this calculus, since the portions reported there may reflect portions of all other vegetables rather than a single vegetable at a time.] In order to find the most frequently reported portion size category, weight each portion size category by the relative frequency with which each portion is reported, so that the portion sizes associated with more frequently consumed vegetables are given more weight than the portion sizes associated with less frequently consumed vegetables.
If a fruit, assign the portion size category reported for the other fruit. If neither fruit juice or fruit portion sizes are reported, assign the most frequently reported portion size for vegetables.

b. When to exclude a case: (note: these exclusion criteria are being developed, and may vary from study to study)

(1) If missing frequency information on fruit or other vegetables.
(2) If nearly all questions are not answered.
(3) If any questions have more than one response answered.

B. BY MEAL SCREENER

For the by meal screener, scoring involves several stages. For the by meal questions, an algorithm for converting the frequency information is used in conjunction with an algorithm for converting the portion size information to Pyramid servings, ultimately resulting in estimates for fruits and other vegetables of daily number of Pyramid servings reported. For the remaining foods, a different algorithm for converting frequency information is used in conjunction with an algorithm for converting the portion size information.

1. Convert reported frequency by meal to average daily number of times consumed:

For each fruit question (q6, q8, q10) and each vegetable question (q7, q9, q11), convert each frequency response category to the midpoint of that frequency range, and standardize to times per day per meal:

Never=0
1-3 days last month=.066
1-2 days last week=.214
3-4 days per week=.499
5-6 days per week=.784
Every day=1

2. Assign fruit and vegetable Pyramid Servings for each portion size category

Fruit

.75	1.0	2.0	2.5
.75	1.0	2.0	2.5

Other vegetables

.75	1.5	3.0	4.5

3. Compute f&v daily pyramid servings for fruit across all meals and for vegetables across all meals

For each food group for each meal, multiply the daily average frequency (from #1) by the portion size (from #2). Sum fruit across the three meals to estimate daily average number of Pyramid servings from fruit. Sum vegetables across the three meals to estimate daily average number of Pyramid servings from vegetables.

4. For other foods, convert reported frequency category to average daily number of times consumed:

Convert each frequency response category to the midpoint of that frequency range, and standardize to times per day:

Never=0
1-3 times per month=.066

1-2 times per week=.214
3-4 times per week=.499
5-6 times per week=.784
1 time per day=1
2 times per day=2
3 times per day=3
4 times per day=4
5 or more times per day= 5

5. Assign fruit and vegetable Pyramid Servings for each portion size category

Juice
.75 1.33 2.17 2.5
Lettuce salad
.5 1.0 2.0 2.5
French fries
1.25 2.3 3.1 4.8
Other white potatoes
.8 1.5 2.4 3.5
Dried beans
.75 1.5 2.5 3.5
Tomato sauce
.36 .72 1.45 1.7
Vegetable soups
.75 1.36 2.27 3.2

6. Compute f&v daily pyramid servings for each food group

For each food group, multiply the daily average frequency (from #4) by the portion size (from #5).

To estimate total daily number of pyramid servings, add across all foods.

NOTE that q.14 mixtures that included vegetables is not included in this algorithm. This question may be helpful in identifying individuals who eat a lot of their vegetables in mixtures. If amounts of vegetables eaten in mixtures are harder to report, their reports may be somewhat less accurate. However, this is untested so far.

7. How to handle missing data

a. Assigning reasonable data to individual questions with missing answers:
(1) Frequency of intake for individual foods
Assume Never=0, since many people don't fill in any bubble when they do not consume a food.

If portion size for that item is answered and the frequency question is not answered, continue to treat as Never.

(2) Portion size

Note: portion size is not missing if the frequency question stem above it is answered Never or assigned Never.

If a vegetable, assign the most frequently reported portion size category for all other individual vegetable questions. [Exclude "other vegetables" from this calculus, since the portions reported there may reflect portions of all other vegetables rather than a single vegetable at a time.] In order to find the most frequently reported portion size category, weight each portion size category by the relative frequency with which each portion is reported, so that the portion sizes associated with more frequently consumed vegetables are given more weight than the portion sizes associated with less frequently consumed vegetables.

If a fruit, assign the portion size category reported for the other fruit. If neither fruit juice or fruit portion sizes are reported, assign the most frequently reported portion size category for the other individual vegetable questions.

b. When to exclude a case: (note: these exclusion criteria are being developed, and may vary from study to study)

(1) If missing frequency information on fruit or other vegetables.

(2) If nearly all questions are not answered.

(3) If any questions have more than one response answered.